

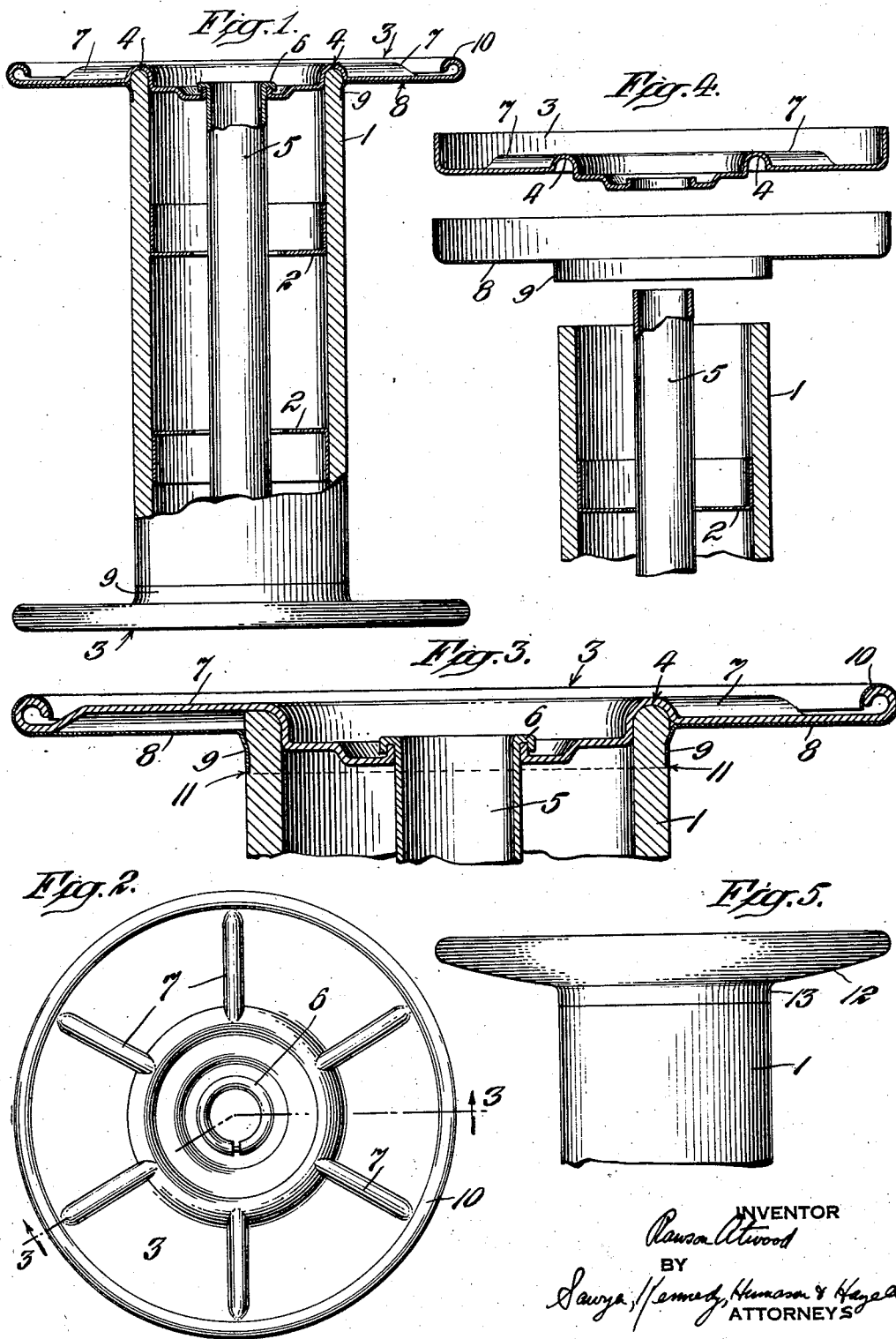
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SPOOL

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SPOOL

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11 Claims. (Cl. 242—123)

This invention relates to spools and more particularly to textile spools.

Textile spools are employed for carrying yarn or thread of silk, rayon or other material in the spinning, knitting and weaving industries. The basic requirements in a textile spool are cheapness, strength and freedom from thread catching and it is an object of the present invention to provide a spool combining these three desirable characteristics in a high degree.

Certain known forms of spool, while relatively satisfactory, are quite expensive to manufacture. Typical of such spools is the turned wooden spool, known for a long time, and which has the additional disadvantage of liability to breakage. Other forms of spool, such as those in which a fiber flange is used at the end and a felt washer is inserted between it and the barrel to prevent thread trapping, are also subject to the disadvantage of a relatively high cost of manufacture. As compared with such proposals, it is an object of the invention to provide a spool having the inherent cheapness of pasteboard and stamped metal construction.

Still other forms of spool, such as the known spool made of stamped metal with a narrow flange integral with the barrel and inserted into a depression in the end flanges, while inexpensive and if properly made relatively free from thread trapping, are deficient in strength for the reason that it is necessary to employ relatively thin metal in their manufacture. As compared with such constructions, the present invention contemplates the production of a spool of a different order of strength but at a cost but little, if any, greater.

It has already been proposed to construct a spool with metal ends and a pasteboard barrel and also in such a construction to diminish thread trapping by forming the end flanges with small projections which are pressed into the barrel adjacent its ends. As compared with such spools, it is an object of the invention to retain the desirable characteristics of strength and cheapness of manufacture inherent in the pasteboard and metal spool while greatly reducing or eliminating thread trapping and further enhancing the strength.

With these and still other objects which will appear in the following full description in mind, the invention consists in the combinations and arrangements of parts and details of construction which will now be described in connection with the accompanying drawing and then pointed out more particularly in the appended claims.

In the drawing—

Figure 1 is a side elevation of a spool embodying the invention in a preferred form and progressively broken away as to its upper part to reveal the elements in central vertical section;

Figure 2 is a plan, or view looking at the spool endwise;

Figure 3 is a section taken on the line 3—3 of Figure 2 and showing one end of the spool on an enlarged scale;

Figure 4 is an exploded vertical central section showing the method of assembly of the spool; and

Figure 5 is an elevation of one end of the spool embodying the invention in a modified form.

Referring to Figure 1, the spool includes a barrel 1, which may be made of pasteboard or similar deformable material and may be provided, where necessary, with internal reinforcing members 2. The end flanges 3 are provided with annular grooves 4 which receive the ends of the barrel and are fastened together by a central tubular member or rivet 5 which passes through centrally located openings and is turned over at its ends as at 6. But one end of the spool is shown in detail, as the construction of the two ends is similar.

As thus far described, the spool of the invention does not differ substantially from known spools. In known spools of this type, however, with the end flanges made of usual material, such as steel .025 inch thick, it has been found that while satisfactory with rayon and similar fibres, the end flanges may buckle or concave when subjected to the pressure produced by winding silk upon the barrel. A hard, firm package is desirable in the trade and while the tension upon the yarn or thread in winding the spool is very small, the aggregate effect of this tension is such as to cause a flowing of the material in the intermediate portion thereof, exerting a relatively great pressure upon the end flanges. It has been attempted to reinforce the end flanges in a spool of the character indicated by using two thicknesses of metal but this, while strengthening the spool against damage by dropping or other abuse, does not substantially strengthen it against pressure on the flanges for the reason that such pressure must be borne ultimately by the outer flange member of a double flange, which is to say, the member which is engaged by the central rivet and receives the barrel. Any attempt to strengthen the end flanges inexpensively by providing ribs or the like must necessarily fail in the conventional spool for the

reason that a smooth inner surface of the flange is essential to permit proper winding and unwinding of the thread. According to the present invention, however, the end flange 3 is stamped with ribs 7 arranged radially or spoke fashion around it and increasing the strength of the flanges as much as 100%. This is made possible by employing a liner 8 which forms an important feature of the invention.

With the liner 8 omitted, it will be observed that the spool necessarily has a crack between the barrel 1 and flange 3 at the joint where these members meet and, as will be readily apparent, it is possible for a thread to catch in this crack, rendering it impossible to get the remainder of the thread off the spool. Such a crack is known in the industry as a thread trap. This thread trap is located, also, in the worst possible place, since it is possible for thread as much as, say, a quarter of the way out on the flange, to slide down along the flange in unwinding and catch in the thread trap, thus preventing removal of the rest of the thread and wasting the remaining material. To avoid this, the liner 8 includes a collar or cylindrical portion 9, which is pressed into the fiber barrel as indicated and continues outwardly along the inner surface of the flange 3, preferably being wrapped around the same as at 10, thus completely lining the inner surface of the flange, rendering the same smooth and leaving a possible thread trap only at the inner end of the collar 9, along the line marked 11. The liner 8 is preferably formed of relatively thin and soft metal, such for example as .010 tin plate, while the end flange 3 may be, as indicated, approximately $2\frac{1}{2}$ times thicker and made of relatively strong steel. The collar 9 is pressed into the barrel so as to be substantially flush with it. As will be noted, the collar 9 is positioned at a point removed from the end of the barrel 1 so that the material of the barrel, which is flush with it both along line 11 and along the joint with the end flange 3, tends to retain it in place lengthwise of the barrel. As is apparent, the removal of any possible thread trap from the end of the barrel to a point relatively far removed therefrom places the thread trap in a location where it is less likely to trap one of the outer layers of thread. The employment of a thin liner, also, reduces the depth of any such thread trap and correspondingly reduces the likelihood of any considerable number of threads being caught. It would therefore be expected that in a spool constructed in accordance with the invention the amount of thread trapping would be very materially reduced. Reports from users, however, indicate, at least in many instances, a complete elimination of thread trapping. This effect, while inexplicable on any known theory, may result from a telescoping action of the collar 9 with reference to the barrel as the pressure of the thread on the flange is increased or diminished, as contrasted with the opening of a crack in constructions in which the barrel is cut down to accommodate a collar or similar member.

The essential parts of the spool constructed in accordance with the invention are shown in Figure 4 and the method of assembly is as follows:

The end flange 3 and liner 8, the collar 9 of which is of sufficient diameter to accommodate the barrel 1, are placed together and their outer edges, which are substantially cylindrical before this operation, are turned over to form a composite flange and liner, the outer rim of which

has the appearance indicated in Figures 1, 2 and 3. These end flanges and liners are now positioned at either end of the barrel 1, together with the rivet 5, and are pressed upon the barrel ends and the rivet ends turned over to produce the spool of Figure 1 but with the collar 9 on the liner not pressed into the barrel. The operation of pressing the collar into the barrel so as to contract its diameter and embed it flush into the deformable material of the barrel is readily performed on a seamer, completing the construction of the spool.

Figure 5 indicates the application of a liner 12, with collar 13 embedded in a barrel 1, to a spool having a curved end flange. In this connection it should be noted that the liner may be identical with the liner 8 of Figure 4 prior to assembly, it being entirely practical to shape this to the curve of the end flange and turn its ends over at the rim in a single stamping operation.

As is apparent, the liner of the invention serves two purposes, the collar 9 and adjacent material serving to eliminate the thread trapping at the juncture between the barrel and end flange and the remainder of the liner providing a simple way of terminating the liner without creating an additional thread trap and also serving to cover the face of the flange 3 which has been rendered irregular by the pressing into it of the strengthening ribs 7. While the utmost utility and simplicity is obtained by constructing the liner in the form shown, it will be apparent that other methods of terminating a radial flange attached to the barrel may be employed if desired.

What is claimed is:

1. A spool for thread or the like comprising a barrel, an end flange, means fastening the said flange to the said barrel, and a liner covering the joint between barrel and flange and comprising a substantially cylindrical portion extending along the barrel from the said joint but not fastened to said barrel and a second portion extending outwardly from said joint along the said flange and fastened thereto, whereby said cylindrical portion is permitted to follow said flange in any axial movement.

2. A spool for thread or the like comprising a barrel, an end flange, means fastening the said flange to the said barrel, and a liner covering the joint between barrel and flange and comprising a substantially cylindrical portion extending along the barrel from the said joint but not fastened to said barrel and a second portion extending outwardly from said joint along the said flange to cover the entire inner face of the said flange and fastened thereto, whereby said cylindrical portion is permitted to follow said flange in any axial movement.

3. A spool for thread or the like comprising a barrel, an end flange, means fastening the said flange to the said barrel, and a liner covering the joint between barrel and flange and comprising a substantially cylindrical portion extending along the barrel from the said joint but not fastened to said barrel and a second portion extending outwardly from said joint along the said flange to cover the entire inner face of the said flange, the said second portion being turned over the rim of said flange onto the outer face thereof so as to form a smooth thread guiding surface for the rim of said flange and thereby fastened thereto, whereby said cylindrical portion is permitted to follow said flange in any axial movement.

4. A spool for thread or the like comprising a barrel, an end flange formed with strengthening ribs pressed into its material with the concave sides of said ribs facing said barrel, means fastening the said flange to the said barrel, and a liner covering the joint between barrel and flange and comprising a substantially cylindrical portion extending along the barrel from the said joint but not fastened thereto and a second portion extending outwardly from said joint along the said flange to cover the entire inner face of the said flange and fastened thereto, whereby said cylindrical portion is permitted to follow said flange in any axial movement.

5. A spool for thread or the like comprising a barrel, an end flange formed with strengthening ribs pressed into its material with the concave sides of said ribs facing said barrel, means fastening the said flange to the said barrel, and a liner covering the joint between barrel and flange and comprising a substantially cylindrical portion extending along the barrel from the said joint but not fastened thereto and a second portion extending outwardly from said joint along the said flange to cover the entire inner face of the said flange, the said second portion being turned over the rim of said flange onto the outer face thereof so as to form a smooth thread guiding surface for the rim of said flange and thereby fastened thereto, whereby said cylindrical portion is permitted to follow said flange in any axial movement.

6. A spool for thread or the like comprising a barrel of compressible material, an end flange fastened thereto and a liner made of metal which is thin and soft relative to said flange covering the joint between barrel and flange and comprising a substantially cylindrical portion extending along the barrel from the said joint and pressed into the said barrel to be substantially flush therewith and a second portion extending outwardly from said joint along the said flange.

7. A spool for thread or the like comprising a barrel of compressible material, an end flange fastened thereto and a liner made of metal which is thin and soft relative to said flange covering the joint between barrel and flange and comprising a substantially cylindrical portion extending along the barrel from the said joint and pressed into the said barrel to be substantially flush therewith and a second portion extending outwardly from said joint along the said flange, to cover the entire inner face of the said flange.

8. A spool for thread or the like comprising a barrel of compressible material, an end flange fastened thereto and a liner made of metal which

is thin and soft relative to said flange covering the joint between barrel and flange and comprising a substantially cylindrical portion extending along the barrel from the said joint and pressed into the said barrel to be substantially flush therewith and a second portion extending outwardly from said joint along the said flange to cover the entire inner face of the said flange, the said second portion being turned over the rim of said flange onto the outer face thereof so as to form a smooth thread guiding surface for the rim of said flange.

9. A spool for thread or the like comprising a barrel of compressible material, an end flange fastened thereto and formed with strengthening ribs pressed into its material with the concave sides of said ribs facing said barrel, and a liner made of metal which is thin and soft relative to said flange covering the joint between barrel and flange and comprising a substantially cylindrical portion extending along the barrel from the said joint and pressed into the said barrel to be substantially flush therewith and a second portion extending outwardly from said joint along the said flange to cover the entire inner face of the said flange.

10. A spool for thread or the like comprising a barrel of compressible material, an end flange fastened thereto and formed with strengthening ribs pressed into its material with the concave sides of said ribs facing said barrel, and a liner made of metal which is thin and soft relative to said flange covering the joint between barrel and flange and comprising a substantially cylindrical portion extending along the barrel from the said joint and pressed into the said barrel to be substantially flush therewith and a second portion extending outwardly from said joint along the said flange to cover the entire inner face of the said flange, the said second portion being turned over the rim of said flange onto the outer face thereof so as to form a smooth thread guiding surface for the rim of said flange.

11. A spool for thread or the like comprising a barrel of compressible material, an end flange fastened thereto and a liner made of metal which is thin and soft relative to said flange covering the joint between barrel and flange and comprising a substantially cylindrical portion extending along the barrel from the said joint and pressed into the said barrel at a location spaced from its end so as to be substantially flush therewith and a second portion extending outwardly from said joint along the said flange.

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CERTIFICATE OF CORRECTION.

Patent No. 2,250,563.

July 29, 1941.

RAWSON ATWOOD.

It is hereby certified that error appears in the printed specification of the above numbered patent requiring correction as follows: Page 2, first column, line 66, for "onstructed" read --constructed--; and second column, line 39, claim 1, after the word "joint" insert --between--; and that the said Letters Patent should be read with this correction therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 2nd day of September, A. D. 1941.

(Seal)

Henry Van Arsdale,
Acting Commissioner of Patents.